CATERPILLAR

Service Manual

308E2 SR MINI HYD EXCAVATOR

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Product: MINI HYD EXCAVATOR
Model: 308E2 SR MINI HYD EXCAVATOR TM2
Configuration: 308E 2SR Mini Hydraulic Excavator TM200001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05210953

Alternator - Remove and Install

SMCS - 1405-010

Removal Procedure

Start By:

a. Remove V belt.

1. Turn the battery disconnect to the OFF position.

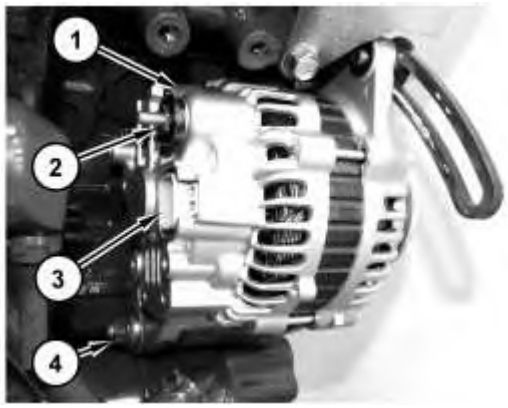

Illustration 1 g02798717

2. Disconnect harness assemblies (2) and (3) from alternator (1).
3. Remove nut (4).

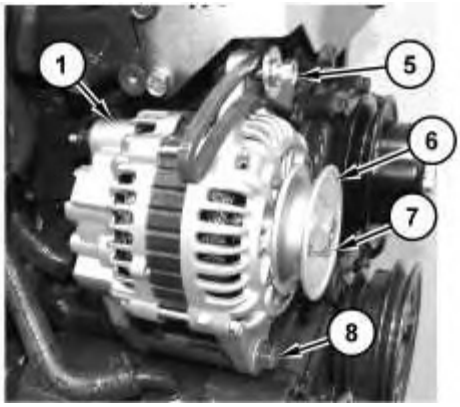

Illustration 2 g02798718

4. Remove nut (7) and pulley (6).
5. Remove bolts (5) and (6).
6. Remove alternator (1).

Installation Procedure

1. Install alternator (1) in the reverse order of removal.
    a. Ensure pulley (6) is correctly oriented.
    b. Tighten nut (7) to a torque of 58 to 79 N·m (43 to 58 lb ft).

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Product: MINI HYD EXCAVATOR
Model: 308E2 SR MINI HYD EXCAVATOR TM2
Configuration: 308E 2SR Mini Hydraulic Excavator TM200001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05221757

Bearing Clearance - Check

SMCS - 1203-535; 1219-535

Measurement Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	198-9142	Plastic Gauge (Green) 0.025 to 0.076 mm (0.001 to 0.003 inch)	1
	198-9143	Plastic Gauge (Red) 0.051 to 0.152 mm (0.002 to 0.006 inch)	1
	198-9144	Plastic Gauge (Blue) 0.102 to 0.229 mm (0.004 to 0.009 inch)	1
	198-9145	Plastic Gauge (Yellow) 0.230 to 0.510 mm (0.009 to 0.020 inch)	1

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

Note: Plastic gauge may not be necessary when the engine is in the chassis.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

Note: Caterpillar does not recommend the checking of the actual bearing clearances particularly on small engines. The checking can result in the possibility of obtaining inaccurate information and the possibility of damaging the bearing or the journal surfaces. Each Caterpillar engine bearing is quality checked for specific wall thickness.

Note: The measurements should be within specifications and the correct bearings should be used. If the crankshaft journals and the bores for the block and the rods were measured during disassembly, no further checks are necessary. However, if the technician still wants to measure the bearing clearances, Tooling (A) is an acceptable method. Tooling (A) is less accurate on journals with small diameters if clearances are less than 0.10 mm (0.004 inch).

NOTICE

Lead wire, shim stock or a dial bore gauge can damage the bearing surfaces.

The technician must be careful to use Tooling (A) correctly. The following points must be remembered:

- Ensure that the backs of the bearings and the bores are clean and dry.
- Ensure that the bearing locking tabs are properly seated in the tab grooves.
- The crankshaft must be free of oil at the contact points of Tooling (A).

1. Put a piece of Tooling (A) on the crown of the bearing that is in the cap.

   Note: Do not allow Tooling (A) to extend over the edge of the bearing.

2. Use the correct torque-turn specifications in order to install the bearing cap. Do not use an impact wrench. Be careful not to dislodge the bearing when the cap is installed.

   Note: Do not turn the crankshaft when Tooling (A) is installed.

3. Carefully remove the cap, but do not remove Tooling (A). Measure the width of Tooling (A) while Tooling (A) is in the bearing cap or on the crankshaft journal. Refer to Illustration 1.

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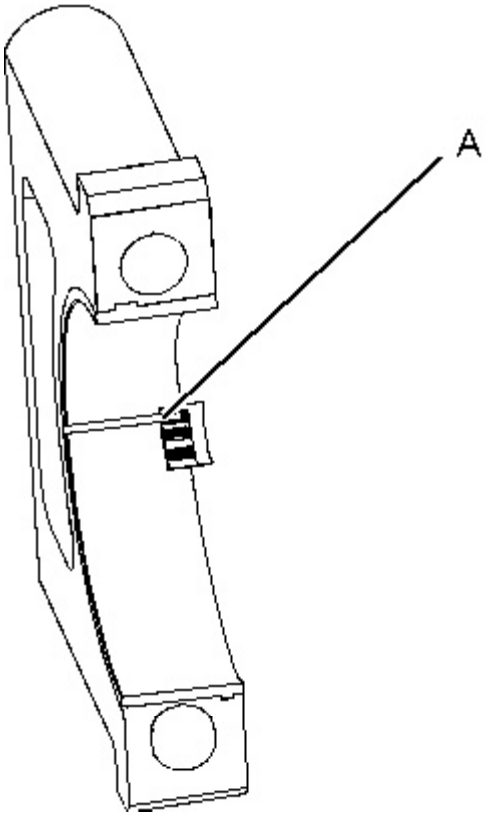

Illustration 1 g01152855

Typical Example

4. Remove all of Tooling (A) before you install the bearing cap.

   Note: When Tooling (A) is used, the readings can sometimes be unclear. For example, all parts of Tooling (A) are not the same width. Measure the major width in order to ensure that the parts are within the specification range. Refer to Specifications Manual, "Connecting Rod Bearing Journal" and Specifications Manual, "Main Bearing Journal" for the correct clearances.

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Product: MINI HYD EXCAVATOR
Model: 308E2 SR MINI HYD EXCAVATOR TM2
Configuration: 308E 2SR Mini Hydraulic Excavator TM200001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05226369

Boost Pressure Sensor - Remove and Install

SMCS - 1917-010

Removal Procedure

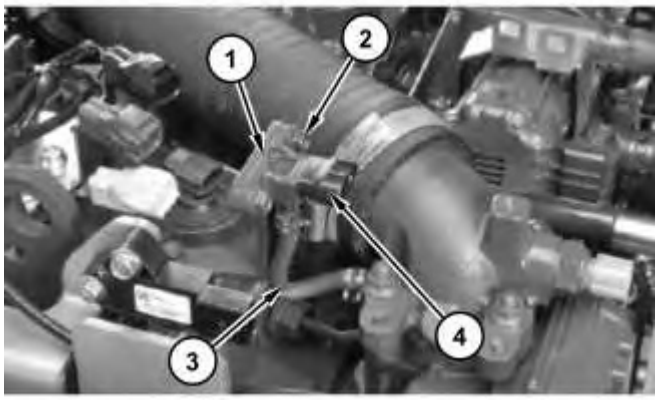

Illustration 1 g03339024

1. Disconnect harness assembly (4). Remove hose (3). Remove bolts (2) to remove boost pressure sensor (1).

Installation Procedure

1. Install boost pressure sensor (1) in the reverse order of removal.
    a. Tighten bolts (2) to a torque of 4 N·m (35 lb in) 5 N·m (44 lb in).

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Configuration: 308E 2SR Mini Hydraulic Excavator TM200001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05223576

Bridge Dowels - Remove and Install

SMCS - 1100-010

Removal Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	5P-0944	Dowel Puller Gp	1

Start By:

a. Remove valve springs.

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

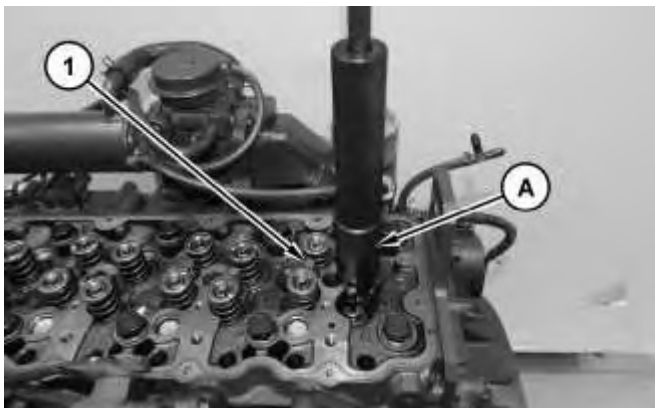

Illustration 1 g02882621

1. Install Tooling (A) and remove bridge dowel (1).

Installation Procedure

Table 2

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
B	390-1142	Spacer	1

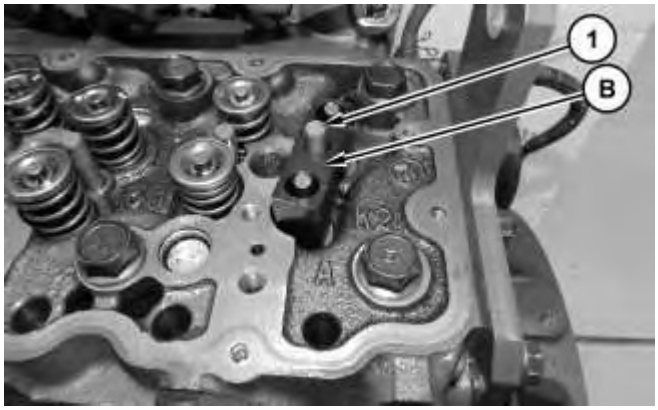

Illustration 2 g02882716

Illustration 3 g02882838

1. Use a press or hammer to drive bridge dowel (1) to a height that is flush with Tooling (B).

End By:

a. Install valve springs.

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Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05307111

Camshaft and Valve Lifters - Remove and Install

SMCS - 1209-010; 1210-010

Removal Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	-	Magnets	8
B	390-1149	Driver	1

Start By:

a. Remove the rocker shaft and pushrods.

b. Remove the flywheel housing.

c. Remove the oil pan. (Only necessary if valve lifters will be removed.)

Note: Refer to Specifications, "Engine Design" for non-specified engine torque values.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

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1. Find top dead center for number 4 piston. Refer to Testing and Adjusting, "Finding Top Center for No. 4 Piston".

Illustration 1 g02795978

2. Ensure that Timing Marks (Y) on the idler gear and the camshaft gear are aligned. Refer to illustration 1.

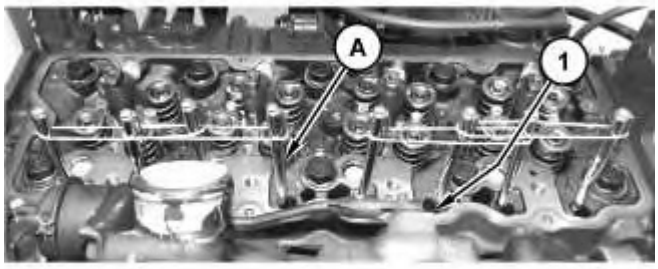

Illustration 2 g02798975

3. Use Tooling (A) to hold up the valve lifters (1) in order to remove the camshaft.

Illustration 3 g02796757

NOTICE

Do not damage the lobes or the bearings when the camshaft is removed or installed.

4. Remove bolts (3).
5. Carefully remove camshaft (2) from the cylinder block.
6. Remove Tooling (A). Use a suitable container to catch the valve lifters (1) as the valve lifters (1) slide out the bottom of the cylinder block.

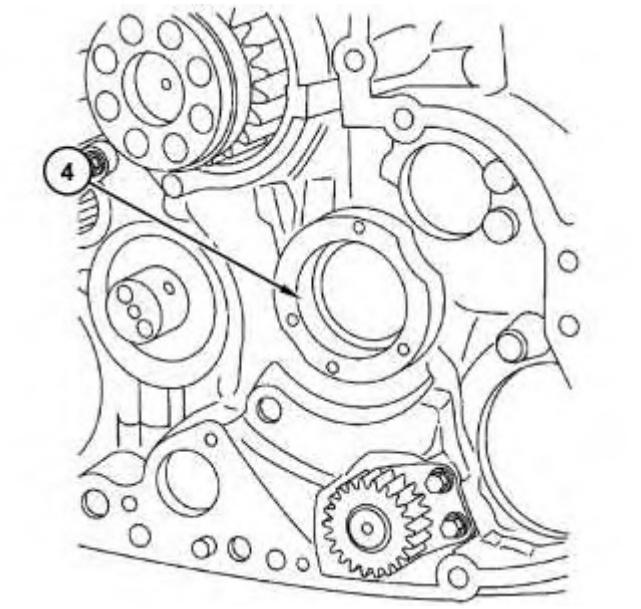

Illustration 4 g02880896

7. Remove camshaft cover (4).

Installation Procedure

1. Install camshaft (2) in the reverse order of removal.

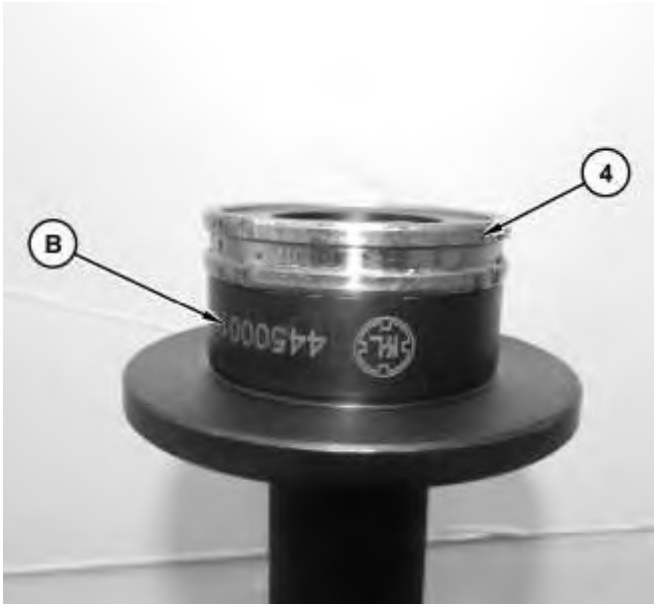

Illustration 5 g02881018

a. Place camshaft cover (4) on Tooling (B).

Illustration 6 g02881076

b. Use Tooling (B) to install the camshaft cover (4).

c. Tighten bolts (3) to a torque of 24 to 27 N·m (212 to 239 lb in).

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Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05221819

Camshaft Gear - Remove and Install

SMCS - 1210-010-GE

Removal Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	1P-0510	Driver Group	1
B	8B-7551	Puller Assembly	1
C	8H-0663	Bearing Puller	1

Start By:

a. Remove the camshaft.

Note: Refer to Specification UENR3421 "Engine Design" for non-specified engine Torque Values.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Dispose of all fluids according to local regulations and mandates.

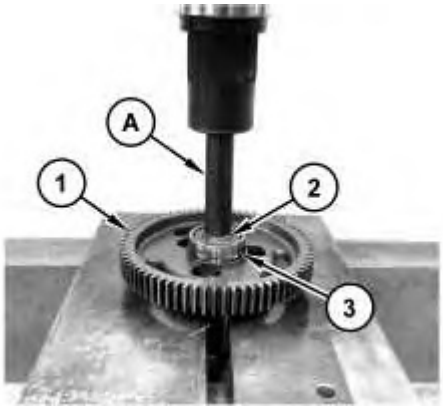

Illustration 1 g02796778

1. Use Tooling (A) in order to remove camshaft gear (1) from camshaft (2).
2. If necessary, apply heat to raise the temperature of the race (3) of the roller bearing to remove.

Illustration 2 g02796779

3. Remove plate (5) from camshaft (2).
4. If necessary, remove key (4) from the nose of camshaft (2).

Installation Procedure

1. Install camshaft gear (1) in the reverse order of removal.

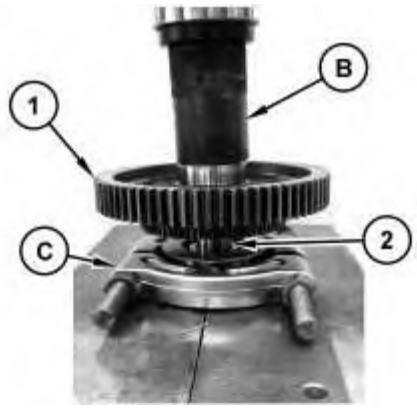

Illustration 3 g02807848

a. Use Tooling (B) and Tooling (C) in order to install camshaft gear (1) onto camshaft (2).

b. Ensure that the camshaft gear and the key are clean and free from wear and damage.

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Configuration: 308E 2SR Mini Hydraulic Excavator TM200001-UP (MACHINE) POWERED BY C3.3B Engine

Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05226370

Camshaft Position Sensor - Remove and Install

SMCS - 1912-010

Removal Procedure

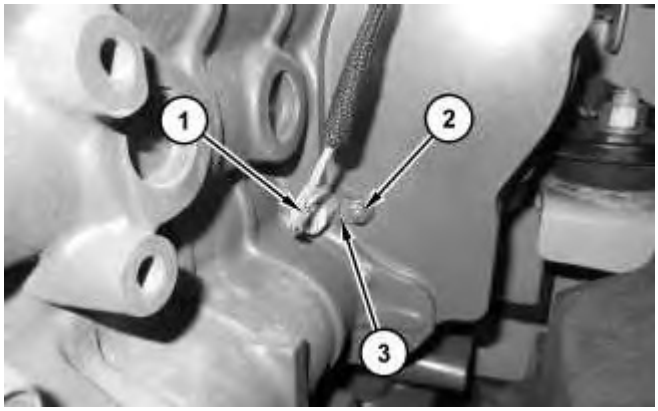

Illustration 1 g03339029

1. Disconnect harness assembly (1). Remove nut (2) to remove camshaft position sensor (3).

Installation Procedure

1. Install camshaft position sensor (3) in the reverse order of removal.
   a. Tighten nut (2) to a torque of 10 ± 2 N·m (89 ± 18 lb in).

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Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines

Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05328575

Camshaft Position Sensor Bushing - Remove and Install

SMCS - 1912-010-BSH

Removal Procedure

Table 1

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	435-3013	Bushing Tool	1

Start By:

a. Remove the camshaft position sensor.

b. Remove the camshaft.

Illustration 1 g03376024

1. Use Tooling (A) to remove bushing (1).

Installation Procedure

Table 2

Required Tools			
Tool	**Part Number**	**Part Description**	**Qty**
A	435-3013	Bushing Tool	1
B	-	Loctite 962T	-

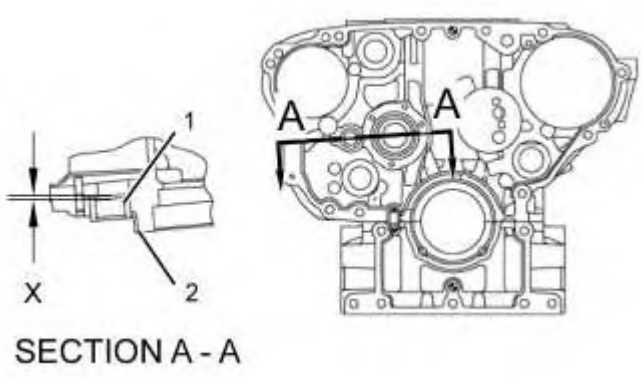

Illustration 2 g03375894

Flywheel Side

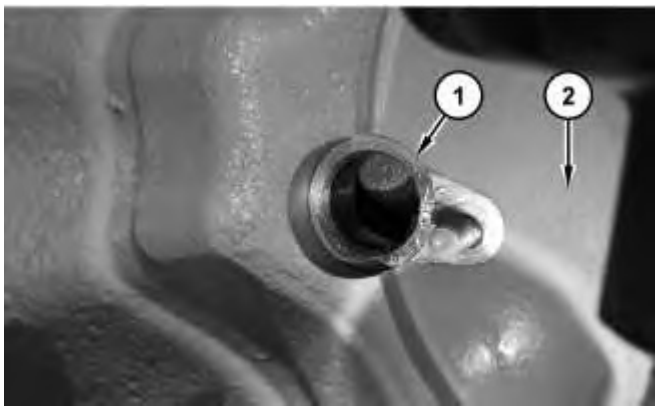

Illustration 3 g03377023

Sensor Side of Crankcase

1. Apply Tooling (B) to the outer diameter of bushing (1).

   Note: Install bushing (1) from the gear train side to Dimension (X). Dimension (X) is 0.10 to 0.60 mm (0.004 to 0.024 inch). Dimension (X) can be measured on the sensor side of the crankcase. Correct installation of bushing (1) will be recessed into crankcase (2) to a depth of Dimension (X).

2. Use Tooling (A) to install bushing (1) into crankcase (2).

End By:

a. Install the camshaft.

b. Install the camshaft position sensor.

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Disassembly and Assembly
C3.3B Tier 4 Final and EU Stage 3B Engines for Caterpillar Built Machines
Media Number -UENR3278-07 **Publication Date -01/09/2014** **Date Updated -11/07/2016**

i05307251

Connecting Rod Bearings - Remove and Install

SMCS - 1219-010

Removal Procedure

Start By:

a. Remove the engine oil pan.

Note: Refer to Specifications, "Engine Design" for non-specified engine torque values.

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Discard all used Connecting Rod fasteners.

Note: If all connecting rod bearings require replacement, the procedure can be carried out on two cylinders at the same time. The procedure can be carried out on the following pairs of cylinders. 1 with 4 and 2 with 3. Ensure that both pairs of the connecting rod bearings are installed before

changing from one pair of cylinders to another pair of cylinders. Refer to Disassembly and Assembly, "Connecting Rod Bearings - Install" for the correct procedure.

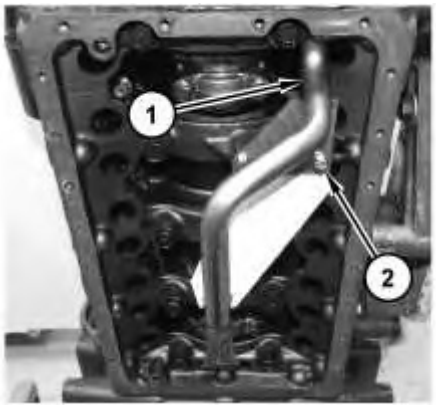

Illustration 1 g02798265

1. Remove bolt (2), the O-ring seal, and oil pump screen (1).

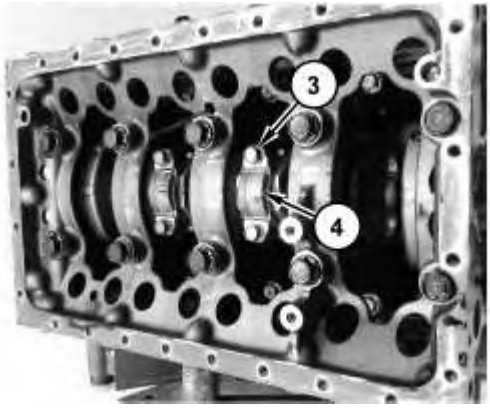

Illustration 2 g02798267

2. The connecting rod and the connecting rod cap should have an etched Number (X) on the side. The number on the connecting rod and the connecting rod cap must match. If necessary, make a temporary mark on the connecting rod and connecting rod cap (4) in order to identify the cylinder number.

3. Remove bolts (3). Remove connecting rod cap (4) from the connecting rod.

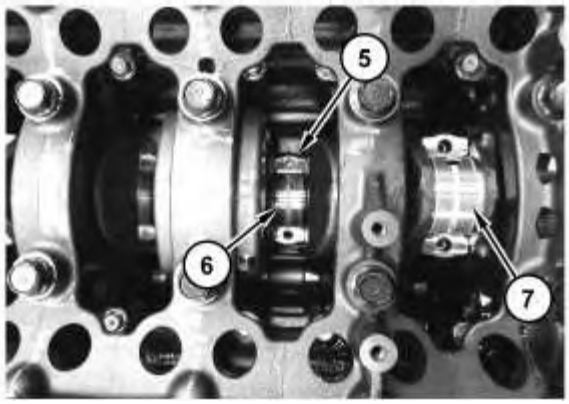

Illustration 3 g02798268

4. Carefully push connecting rod (5) into the cylinder bore until connecting rod (5) is clear of the crankshaft. Remove lower bearing shell (7) and then remove upper bearing shell (6) from connecting rod (5). Keep the bearing shells together.
5. Repeat Step 3 through Step 4 for the remaining bearing shells.

Installation Procedure

NOTICE

Keep all parts clean from contaminants.

Contaminants may cause rapid wear and shortened component life.

NOTICE

Discard all used Connecting Rod fasteners.

1. Ensure that the bearing shells are clean and free from wear and damage. If necessary, replace the bearing shells.

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